3.4.1.2 Proposed drilling rig make and specifications (thrust, pullback and torque) and required footprint.
3.4.1.3 Proposed water source.
3.4.1.4 Other plans and documents as required in Specification No. 13024 and the Project Specific Conditions.

3.5 Prior to Commencing Work
3.5.1 Prior to commencing Work, Contractor shall complete in its entirety the HD Drilling Program. In the following sections below, the required submittals are listed to complete the HDD program.

3.5.2 Soils Analysis Review Meeting:
3.5.2.1 As provided in Paragraph 18.9.4.2 of Specification No. 13024, prior to commencement of the HDD installation, Contractor will schedule a Soils Data Review Meeting with PG&E to discuss Contractor's interpretation of the available soils information and its implications for the HDD installation. The discussion will address planning the HDD borehole design not only in the context of proven, actual soils conditions, but also the possibility of undocumented soils conditions that may reasonably be anticipated in the area.

3.6 Management Plan:
3.6.1 Contractor shall submit a Management Plan that outlines the proposed project management structure and proposed schedule, naming the individuals responsible for the main aspects of HDD and pipeline Contractor activity and the proposed division of responsibilities between the Contractor and any proposed subcontractor. The Management Plan shall include an integrated schedule of detailed activities in support of the HDD installation.

3.6.2 The Management Plan will provide brief resumes for the key individuals proposed for the project. Contractor shall ensure that all necessary permits and authorizations to conduct the HDD construction activities have been secured. The person responsible for performing these enquiries will be identified in Contractor's Management Plan. Contractor shall locate and acquire fresh water for the HDD installation, Contractor shall dispose of the water in accordance with all federal, state and local laws, rules and regulations and any applicable landowner agreements

3.7 Proposed Schedule:
3.7.1 Contractor shall submit detailed Gantt Chart showing mobilization, pilot bore, reaming, pullback, restoration and demobilization.

3.8 Final Borehole Design:
3.8.1 PG&E will develop a preliminary design for a proposed HDD installation for the purpose of feasibility assessment, planning the Work, and securing the required permits. This design will be based on the actual line pipe to be used for this installation, plus a series of assumptions about the direction of drilling, access to the entry and exit points, and the geometry of the HDD borehole. PG&E's permit applications state that these preliminary designs will be subject to change in the final design for the HDD borehole that will be submitted by the Contractor selected by PG&E. Minor changes in the 'design' location of the entry and exit points for the HDD borehole may be negotiated with PG&E. All significant variables regarding the design of the HDD borehole, including the direction of drilling, entry and exit angles, the radius of borehole curvature, the borehole diameter, and the maximum

borehole depth may be modified by Contractor based on its experience and judgment, to maximize the chances of a trouble-free and successful installation, if such modifications are approved by PG&E. Contractor's Proposed Final Borehole Design for the HDD borehole must be submitted to PG&E for review and approval prior to commencement of drilling of the pilot borehole. The design drawing will include the following information:

3.8.2 Entry and exit points and tail ditch or pits. Contractor will specify the required size and orientation of the entry and exit pits. PG&E will stake the required locations prior to construction.

3.8.3 Anticipated entry and exit angles

3.8.4 Drill path alignment (plan and profile views) identifying borehole depths at key locations, the location and length of proposed straight portions of the borehole, and the locations, lengths and radius of curvature of all curved segments of the borehole

3.8.5 Locations and elevations of all buried utility and belowground structures crossing or in proximity to the HDD borehole and anticipated clearance dimensions. If Contractor foresees a situation where a minimum separation of 18-inches between the carrier line and existing utilities or underground structures may occur during an HDD installation, PG&E must be notified before commencement of the HDD pilot hole. Site-specific variances may be allowable with appropriate safeguards.

3.8.6 The total underground, down hole length of the borehole along the proposed alignment, from entry to exit point.

3.8.7 The total straight-line, horizontal length of the borehole along the proposed alignment, from entry to exit point

3.8.9 The anticipated final borehole diameter prior to pulling in the pipe string.

3.8.10 The finalized temporary workspace requirements based on the final plan for fabricating the pipe string in segments, or in its entirety.

3.8.11 Location of PG&E permanent easement.

3.8.12 Contractor's Proposed Final Borehole Design may need to be based on a Structural Analysis of the pipeline during the HDD installation process. If required, the analysis will demonstrate that stresses in the HDD pipe string of the diameter, wall thickness, and grade specified by PG&E will remain within acceptable and prudent limits during pipeline installation. It will address the issue of whether pipe buoyancy control is required, and specify the method of this control, if required. It will address the issue of estimated total maximum pull-back force required during the installation, and demonstrate that the HDD rig proposed for the installation has a prudent factor of safety with regard to its rated capacity in comparison with this maximum estimated force.

3.9 Boring Plan:

3.9.1 Prior to commencement of drilling, Contractor shall submit a Boring Plan that describes the anticipated rig capacity, the proposed equipment and method for advancing the borehole through expected soil conditions, angles, depth, and exact location of the exit ditch the pilot hole diameter, the proposed reaming plan including the number and diameter of pre-reams/back-reams and diameter of the final reamed borehole, and the contingency equipment and plans for dealing with soil conditions that a soils engineer could reasonably expect could be encountered at the proposed HDD installation site. The Boring Plan will also address the anticipated hours of operation during the HDD borehole drilling and installation process, the minimum number of personnel, and their responsibilities, on-duty and on-site during all HDD drilling operations. Contractor shall submit the Boring Plan for PG&E's review and approval prior to mobilization. PG&E's review and acceptance of Contractor's boring plan shall not relieve Contractor of the responsibility to perform and warrant the Work as provided herein.

3.10 Safety Plan:

3.10.1 Contractor shall ensure that safe working procedures and conditions are maintained. Contractor shall provide an HDD installation site Safety Plan after award of the HDD installation contract.

3.11 Communications Plan:

3.11.1 Contractor shall submit a detailed Communications Plan that clearly shows the names and phone numbers of all PG&E personnel and Agency / Regulatory entities that are to be notified if a significant adverse event occurs while drilling. This Plan must show names and phone numbers for PG&E's Project Manager, PG&E's Construction Manager, PG&E's Lead Inspector, contacts for California Department of Fish and Game (CDF&G), Regional Water Quality Control Board (RWQCB), California State Lands Commission (CSLC), U.S. Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USF&WS), and other entities as appropriate; e.g., local fire department, Highway Patrol, Rail Road.

3.12 Site Access Plan

3.12.1 Contractor will submit a proposed HDD Site Access Plan, defining Contractor's plans for accessing the temporary workspace required for the HDD installation, with the required equipment and support facilities. PG&E will endeavor to secure adequate temporary workspace for the HDD drilling and installation process, as well as for the fabrication of the HDD pipe string, and this temporary construction workspace will be shown in the drawings supplied with PG&E's Project-Specific requirements. Contractor shall review the proposed workspace and notify PG&E if, in its opinion, additional workspace is required, when it submits its proposal for the Work.

3.13 Drilling Fluids Plan:

3.13.1 Contractor shall submit a written Drilling Fluid Plan to PG&E for approval, prior to commencement of drilling operations. The plan must provide for anticipated soil and rock conditions, fluid selection, drill bit and reamer selection, and include volume calculations. It will define the proposed viscosities for soil transportation to the entry and exit pits. The plan will include MSDS for all proposed and anticipated mud mixes and fluid additives. It will address estimated pumping capacity and pressures. It will identify the source of fresh water for mixing the drilling mud. Contractor shall secure the required agreements and permits to procure this needed fresh water.

3.13.2 The Drilling Fluid Plan will address Contractor's plans for a tail ditch, and/or mud recirculation pits, and shoring, if required. It will address the use of small earthen berms, or other measures proposed to contain mud overflow from the pits. It will address safety measures required for personnel working in the vicinity of these mud recirculation pits. The Drilling Fluid Plan will provide for disposal of excess drilling fluids in accordance with all federal, state and local, laws rules and regulations and applicable landowner agreements.

3.13.3 As provided in Paragraph 18.9.4.6 of Specification No. 13024, Contractor shall provide the services of a drilling fluid engineer on site, to analyze the drilling fluid, and perform the following tasks:

3.13.4 The first indication that a frac-out may have occurred is a reduction or stoppage of mud returns in the entry-side mud-pit. The drilling fluid engineer is responsible for continuously monitoring drilling fluid returns. If a reduction or stoppage is observed, mud circulation and drilling operations must be arrested until the cause of the loss of returns is determined and corrected.

3.13.5 The drilling fluid engineer will maximize recirculation of drilling fluid surface returns, by providing solids control and fluid cleaning equipment of a configuration and capacity that can process surface returns and produce drilling fluid suitable for reuse.

3.13.6 The drilling fluid engineer is responsible for monitoring the drilling fluids, such as pumping rate, pressures, viscosities, and density during the pilot bore and back reaming, and

the pipe installation process, to ensure adequate cuttings removal, and that the stability of the borehole is maintained.
3.13.7 The entry and exit pits should be of sufficient size to contain the expected return of drilling fluid and soils cuttings during the entire drilling reaming and pullback operations. They will be maintained and deepened, and re-shored as necessary, as required during the installation process.
3.13.8 When applicable, Contractor shall segregate drilling fluids from native soil, and contain the cuttings for disposal, in the method outlined and approved in Contractor's Drilling Fluid Plan. Contractor shall transport and dispose of excess drilling fluids as necessary to avoid any overflow of such fluids onto the site.

3.14 HDD Fluid Release Contingency Plan:
3.14.1 Contractor shall submit a written HDD Fluid Release Contingency Plan prior to commencement of the HDD installation that will address prevention, detection, and response. Specifically, it will also address the following issues:
3.14.2 Routing of the HDD borehole within the anticipated soil strata so as to minimize the possibility of a frac-out, the possible presence of natural or man-made soil disturbances or discontinuities that could facilitate a frac-out, monitoring of drilling returns and other plans to quickly detect the possible occurrence of a frac-out, limiting mud circulation pressures to avoid hydro-fracture of the overburden, and a site-specific frac-out response plan. The response plan must define who is responsible to perform the various notification and response functions, and the equipment and materials that will be on hand to contain and clean up a frac-out if it occurs. The site-specific plan will address all areas detailed in the general plan.
3.14.3 The HDD Fluid Release Contingency Plan will identify the personnel on site during the entire HDD installation process with responsibility for detecting whether a frac-out has occurred. During nighttime operations, if they occur, and for HDD installations under waterways, any proposed special measures required for frac-out detection will be addressed.
3.14.4 In sensitive areas, the Contractor may be required to have a secondary containment system around the mud pits (e.g., small earthen berms) to contain mud overflows.
3.14.5 In sensitive areas, the Contractor may be required to have hay bales on site during HDD drilling and string pullback operations, or other means to contain a frac-out, if one occurs.
3.14.6 In sensitive areas, the Contractor may be required to have a Vac-truck continuously on-site during drilling operations to recover drilling fluids in the case of a frac-out. In addition, and particularly as the pilot hole approaches the exit point, Contractor may be required to have a backhoe positioned over the HDD borehole, on stand-bye, to help contain a frac-out.
3.14.7 In areas where are extremely sensitive conditions exist along the route of the HDD borehole, such as drilling under levees or aqueducts, PG&E may require detailed analysis of expected soil conditions along the approved borehole path, and structural calculations of the expected hydro-fracture pressures along the path of the HDD borehole. PG&E will then require Contractor to implement a program to limit mud circulation pressures to remain below the calculated hydro-fracture pressures. See the procedures set out by the Corps of Engineers in "Guidelines for Installation of Utilities Beneath Corps of Engineers Levees Using Horizontal Directional Drilling".

3.15 Post Construction
3.15.1 Copies of driller's log:
3.15.1.1 Final as-builts showing down hole weld locations as well as all other requirements of Specification No. 13024 and the Project Specific Conditions. Contractor shall produce

appropriate shape files for all welds and project the welds to their final down hole locations to provide a complete as-built for the drilled string. All shape files shall be accumulated in accordance with PG&E's most recent requirements for GPS as-builting.

3.15.2 Elevation Survey:

3.15.2.1 When drilling under sensitive structures such as aqueducts and highways, Contractor shall provide a highly-accurate elevation survey of the surface elevation of structures along the proposed borehole path, both before drilling commences, and after the HDD installation is complete, in order to demonstrate that the drilling of the HDD borehole, and pulling-in of the HDD pipe string, did not result in heaving or settlement of the sensitive structure. This requirement is typical of most Caltrans Highway crossings. Contractor will retain a Registered Land Surveyor to generate the before and after surveys and, if required, during construction.

3.16 Drilling Operations

3.16.1 Operator Training:

3.16.1.1 All personnel must be properly trained and, if required, have previous experience utilizing the make and model of equipment that is being used to install the pipeline.

3.17 Equipment

3.17.1 Drilling Rig:

3.17.1.1 The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during drilling and pull-back operations. There shall be a system to detect electrical current from the drill string and an audible alarm which automatically sounds when an electrical current is detected.

3.17.2 Drill Head:

3.17.2.1 The drill head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and drilling fluid jets.

3.17.3 Mud Motors (if required):

3.17.3.1 Mud motors shall be of adequate power to turn the required drilling tools.

3.17.4 Drill Pipe:

3.17.4.1 Drill pipe shall be constructed of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32-36 RC. Drill pipe shall be inspected regularly for wear and sections exhibiting bending, thread damage or excessive ware shall be replaced prior to commencement of drilling operations.

3.17.5 Guidance System:

3.17.5.1 A Magnetic Guidance System (MGS) or proven gyroscopic system shall be used to provide a continuous and accurate determination of the location of the drill head during the drilling operation. The guidance shall be capable of tracking at all depths up to one hundred feet and in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The guidance system shall be accurate to +/-2% of the vertical depth of the borehole at sensing position at depths up to fifty feet and accurate within 1.5 feet horizontally. The Guidance System shall be of a proven type and shall be operated by personnel trained and experienced with this system. The Operator shall be aware of any

magnetic anomalies on the surface of the drill path and shall consider such influences in the operation of the guidance system if using a magnetic system.

3.17.6 Drilling Fluids Mixing System:
3.17.6.1 A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid. The drilling fluid reservoir tank shall be of sufficient capacity to facilitate optimal drill head penetration, cooling and lubrication of the bore hole while adequately containing all fluids. Mixing system shall continually agitate the drilling fluid during drilling operations.
3.17.7 Drilling Fluids:
3.17.7.1 Drilling fluid shall be composed of clean water and appropriate additives clay. Water shall be from an authorized source with a pH of 8.5 - 10. Contractor is responsible for acquisition of water and all such costs are to be included in bid pricing. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No potentially hazardous material may be used in drilling fluid. Disposal of excess drilling fluids is the responsibility of Contractor and shall be conducted in compliance with all environmental regulations, right-of-way and workspace agreements, and permit requirements. Drilling fluid disposal procedures proposed for use shall be submitted to PG&E for approval. No procedure may be used which has not been approved by the appropriate PG&E representative.
3.17.8 Pressure While Drilling (PWD) Tool:
3.17.8.1 If required, Contractor shall utilize a down-hole instrument capable of relaying the actual pressure of the drilling fluids, at the drill head, to the control room / panel. Specifications for such tooling and instrumentation shall be submitted and to be reviewed and approved by PG&E prior to use.
3.17.9 Drilling Fluid Delivery System:
3.17.9.1 The mud pumping system shall have a minimum volumetric flow rate such that it is overly capable of delivering the drilling fluid at a constant minimum pressure that is consistent with the soil strata and the drilling fluids plan. The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and conveyed to the drilling fluid recycling system. If required, a berm, minimum of 12" high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage and recycling facilities.
3.17.10 Drilling Fluid Recycling System:
3.17.10.1 If recycling is utilized, the drilling fluid recycling system shall separate sand, dirt and other solids from the drilling fluid to render the drilling fluid re-usable. Spoils separated from the drilling fluid will be stockpiled for later use or disposal.
3.17.11 Pipe Rollers:
3.17.11.1 Pipe rollers shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall used to prevent excess sagging of pipe and shall be designed and placed to avoid damage to the pipeline coating.
3.17.12 Restricted Equipment:

3.17.12.1 Other devices or utility placement systems for providing horizontal thrust (such as hydraulic or pneumatic pipe rammers) other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

3.18 SET-UP

3.18.1 Job Site Access and Work Space:

3.18.1.1 Unless otherwise required in the Project Specific Conditions, Work space and access will be acquired by PG&E and defined on the Construction Drawings. In the event the Work space provided conflicts with Contractor's logistical needs, Contractor shall alter construction practices to meet existing spatial requirements or acquire additional temporary working space. Additional workspace and access may be acquired by Contractor only with PG&E review and approval. The expense of acquiring additional workspace shall be borne by Contractor.

3.18.2 Rig Stabilization:

3.18.2.1 Contractor will construct a dead man as required to support and stabilize the drilling and pipe pulling equipment. The HDD Drilling Plan will define Contractor's plan for the installation and removal of the required dead man.

3.18.3 Conductor Barrel:

3.18.3.1 If uncohesive soils are found in the upper strata (peat, etc.), Contractor shall install a Conductor Barrel to adequate depths at both the entry and exit points in order to minimize the potential for loss of circulation and inadvertent returns. The barrel shall be of adequate size (usually 1.5 times the diameter of the bore string) to prevent damage to the coating when pulling back through the Conductor Barrel. If Contractor's Geotechnical Engineer warrants that these measures are not required and that other mitigations will reduce the probability of Frac Out, this requirement may be waived.

3.19 Existing Infrastructure

3.19.1 Pot Holing Foreign Lines:

3.19.1.1 Contractor shall excavate all known infrastructure that is within 10 feet of the bore path of the largest ream to ensure that no drilling and reaming operations will impact the existing infrastructure.

3.19.2 Parallel Drilling:

3.20 PILOT HOLE

3.20.1 Conflicts:

3.20.1.1 In the event down-hole conditions change or unanticipated obstructions occur, only PG&E may alter any design parameters. Contractor will thoroughly document all field changes requested and approved.

3.20.2 Tolerances:

3.20.2.1 Elevation: Plus 0 feet, minus 30 feet.

3.20.2.2 Alignment: Plus or minus 10 feet.

3.20.2.3 Entry Point Location: The pilot hole shall initially penetrate the ground surface at the exact location shown on the Drawings.

3.20.2.4 Exit Point Location: The pilot hole shall finally penetrate the ground surface within plus or minus 1.5 feet of the alignment shown on the Drawings and within plus 50 feet and minus 0 feet of the length shown on the Drawings.

3.20.3 Curve Radius:
3.20.3.1 The pilot hole shall be drilled at a radius of no less than the radius specified in the Project Specific Conditions.
3.20.4 Installed Radius of Curvature:
3.20.4.1 The drilled radius will be calculated over any three-joint (range 2 drill pipe) segment using the following formula:
Rdrilled = (Ldrilled/Aavg)*57.32
Rdrilled = drilled radius over Ldrilled
Ldrilled = length drilled, no less than 75 feet and no greater than 100 feet
Aavg = total change in angle over Ldrilled

3.21 CHANGES TO BOREHOLE DESIGN:
3.21.1 As provided in Final Bore Hole Design of this Specification, Contractor may propose alternate final borehole design, altering the exit location and angle if a more effective design is warranted and if such alternate is approved by PG&E prior to start of drilling activities.
3.21.2 Pilot Hole Quality Assurance:
3.21.2.1 Contractor shall continually monitor the three-dimensional location of the bore. Contractor shall drill for the pipelines according to the centerlines as shown on the final borehole design that has been approved by PG&E. Contractor shall submit the pilot-hole data on a daily basis to the designated PG&E representative. The PG&E representative will review the data daily to ensure the pilot hole is meeting all requirements of the final bore design. If an unacceptable deviation exists between the final bore design and the as-drilled pilot hole, Contractor may be directed to take corrective measures to ensure the pilot hole is in compliance. Once the pilot hole is completed, the pilot-hole as-built data will be submitted for PG&E approval and acceptance prior to start of back reaming operations. The designated PG&E representative will review and accept or reject the as-installed pilot hole within two (2) hours of receiving data. If the data received is questionable, Contractor may be required to submit a detailed profile of the pilot hole showing actual trajectory at intervals not greater than the length of the drill stems used during actual drilling. In the event significant deviations exist that exceed the tolerances of the requirements, Contractor shall abandon the pilot hole at Contractor's cost and install a new pilot hole at an agreed upon location that meets all project requirements.
3.21.3 Circulation and Drilling Fluids
3.21.3.1 Recirculation:
Contractor shall maximize recirculation of drilling fluid surface returns. Contractor shall provide solids control and fluid cleaning equipment of a configuration and capacity that can process surface returns and produce drilling fluid suitable for reuse.
3.21.3.2 Segregation:
Contractor shall containerize and segregate drilling fluids from native soil. Contractor shall not allow drilling fluids to migrate onto the soil. Contractor shall transport and dispose of the drilling fluids as necessary to avoid any overflow of such fluids onto the site.
3.21.3.3 Disposal:
Contractor shall dispose of excess drilling fluids in compliance with all environmental regulations, right-of-way and workspace agreements, and permit requirements. Drilling fluid disposal procedures proposed for use shall be submitted to PG&E for approval. No procedure may be used which has not been approved by PG&E. PG&E, at its option, may secure an excess drilling fluid disposal site for Contractor. If hazardous material sites occur along the bore path, drilling fluids may exceed threshold levels and could require handling and disposal as a hazardous waste.

3.21.4 Back Reaming

3.21.4.1 General:

Operations that result in over-cutting of the borehole during the back reaming operation will be avoided to minimize the possibility of post-installation settlement of surface structures. Contractor shall develop a reaming plan that strives to remove uniform quantities of material with each pass while minimizing the down hole pressures that could lead to loss of circulation conditions.

3.21.5 Pre-reaming:

3.21.5.1 Contractor shall conduct pre-reaming operations to ensure that a hole sufficient to accommodate the pull section has been produced. Any damage to the pipe resulting from inadequate pre-reaming shall be the responsibility of Contractor. The final hole shall be pre-reamed to an agreed upon diameter that will minimize pull forces required and prevent damage to the pipeline and coating. The following table delineates recommended minimum sizes for various pipeline diameters. Use of this table does not relieve Contractor of the obligation to provide a hole suitable for the specific project. If Contractor elects to utilize a smaller final hole size, Contractor will submit documentation supporting their recommendation for optimum hole size.

Nominal Diameter	Hole Size	Nominal Diameter	Hole Size
4	7	24	33
6	10	30	42
8	13	32	44
10	16	34	46
12	20	36	48
16	24	40	53
20	27	42	55

3.22 Handling Pipe

3.22.1 As provided in the Project Specific Conditions, Contractor or PG&E shall place the pipe on the rollers provided by Contractor. PG&E may elect to provide standby equipment to assist in guiding the pipe. Such assistance by PG&E does not relieve Contractor of the responsibility to ensure that the rollers are adequate and spaced properly and for the smooth, continuous, efficient pull of the pipe.

3.22.2 Pullback

3.22.2.1 General:

The pull back of the HDD string will be planned for and performed in a way that minimizes the possibility of heaving of overhead utilities or structures.

3.22.2.2 Buoyancy Modification:

Buoyancy modification shall be used at the discretion of Contractor provided such buoyancy modification procedure proposed by Contractor shall be submitted to PG&E for approval. No procedure shall be used which has not been approved by PG&E. Contractor shall be responsible for any damage to the pull section resulting from buoyancy modification.

3.22.2.3 Pulling Loads:

The maximum allowable tensile load imposed on the pull section shall be equal to 90 percent of the product of the specified minimum yield strength of the pipe and the area of the pipe section. If more than one value is involved for a given pull section, the lesser shall govern.

3.22.2.4 Torsional Stress:
A swivel shall be used to connect the pull section to the reaming assembly to minimize torsional stress imposed on the section.
3.22.2.5 Pull Section Support:
The pull section shall be supported as it proceeds during pull back so that it moves freely and the pipe and corrosion coating are not damaged.
3.22.2.6 Coating Repair and Application:
During the pullback process, the pipe coating will be inspected and, if defects are present, Contractor shall repair the coating. Contractor shall familiarize itself with the specific jobsite practices that will be used to coat weld joints and make repairs to the coating with emphasis on required cure times.
3.22.2.7 Additional Strings:
If jobsite spatial limitations are present, it will be necessary to weld additional strings of pipe to the pullback section during pullback operations. Contractor shall familiarize itself with the specific jobsite practices that will be used to weld and X-ray the pipe as well as the coating of weld joints.
3.22.2.8 Contractor Downtime:
Contractor downtime during pullback operations due to project-specific logistical requirements, coating inspection and repair and string addition shall be included in Contractor's bid pricing.
3.22.3 Sacrificial Pipe:
3.22.3.1 At least 10 feet of sacrificial pipe, of the same diameter and wall thickness as the HDD pipe string, coated in an identical manner as the pipe string, will be included as a leading section of the HDD pipe string. After pullback of the pipe string, the entire sacrificial section will be advanced aboveground and carefully inspected by PG&E's representative for coating system or other damage. If significant damage is noted, the pipe string must be further advanced as required by PG&E's representative. Contractor will cut, remove and dispose of the sacrificial pipe as necessary.
3.23 Quality Assurance
3.23.1 Dimensional Tolerances:
3.23.1.1 All pipe shall be installed in such a manner that as-manufactured dimensional changes do not exceed 2 percent. At PG&E's discretion, PG&E will inspect the installed pipeline with a geometric device (Caliper Pig). If the pipeline is found to exceed the 2 percent tolerances specified, Contractor will be instructed by PG&E, at PG&E's sole discretion, to either correct the defect or install a new pipeline in accordance with these Specifications. Contractor will salvage and reuse undamaged pipe.

3.23.2 Coating Protection:
3.23.2.1 The pull section shall be inspected for defects with a holiday detector as it enters the hole. Any coating damage found at that time shall be repaired. Inspection and repair of corrosion coating shall be conducted in accordance with the applicable Specification. All boring, reaming and pulling operations will be conducted in such a manner as to ensure that no damage to the pipe or weld joint coating occurs. Subsequent to installation of the HDD pipe and connection of the direct burial pipe to the HDD pipe, PG&E will perform a current

drain inspection of the coating. PG&E estimates that this will take approximately four (4) hours.

3.23.3 Damaged Pipe:

3.23.3.1 Pipe that has dimensional variances exceeding 2% or coating defects attributable to improper installation is considered damaged. Damaged pipe costs will be deducted from Contractor's compensation.

3.24 Restoration

3.24.1 In addition to the requirements of Specification No. 13024 and the Project Specific Conditions, Contractor will perform final site clean-up associated with rig footprint including, but not limited to, disposal of excess drilling mud from the entry and exit pits, backfilling excavations with native soil, compacted in lifts, and final site grading to establish original contours. If required, Contractor shall re-pave the tail ditch.

3.25 As-builts

3.25.1 General:

3.25.1.1 In addition to the requirements of Specification No. 13024 and the Project Specific Conditions, Contractor shall provide as-built drawings of the HDD segment based upon the as-drilled records, complying with PG&E's latest requirements for GPS As-Builting. Contractor, prior to commencement of the directional drill, will establish a Survey Grid Line and provide a program of monitoring the actual location of the borehole during drilling operations, at all times providing and maintaining instrumentation which will accurately locate the pilot hole. The actual pilot hole location will be plotted at intervals no greater than the length of the drill stems used during actual drilling on the previously described final borehole design drawings. These as-designed versus as-drilled drawings will be maintained in an updated condition at all times at the Work site and will be made available for inspection to PG&E or PG&E's representative at any time. Significant variations between the as-designed and as-drilled boreholes will be immediately brought to PG&E's attention for discussion and possible corrective action.

3.25.1.2 Any assumptions that the as-built preparer makes are recorded in the as-built record. For example, onsite occurrences may cause raw data to be unrepresentative and there may be discrepancies between the down hole tool and Tru-Tracker information. This may force the preparer to make certain assumptions for closure. Similar discrepancies between pilot-hole survey data and post-installation survey data must be reconciled; therefore, the as-built package shall contain more than a ground survey or planimetric drawing that plots the coordinates of the new installation. The package shall contain the following data:

3.25.1.3 The preparer should provide a brief report indicating how the raw data was interpreted and which data; i.e., survey tool, Tru-Tracker, and/or post-installation survey, was used. The preparer should note any changes from the initial construction survey and include a statement and explanation of the calculation method used.

3.25.1.4 The prepare should also provide the as-built with a graphical or pictorial map showing location of the new installation using land survey practices and procedures. This document should determine the geodetic position of the new pipe in a manner that can be reproduced during subsequent surveys. The as-built drawing should accurately illustrate the angles of entry and exit, pipeline stationing and elevations, vertical and horizontal radius of curvature, and PG&E permanent easements.

3.26 Operational Data

3.26.1 Contractor shall at all times provide and maintain instrumentation which will accurately locate the pilot hole and, if required, measure drill string axial and torsional loads, and measure drilling fluid discharge rate and pressure. Contractor shall provide access to PG& to these instruments and their readings at all times. A log of all recorded readings shall

be maintained at the Work site and will become a part of the "As-Built" information to be supplied by Contractor.

3.26.2 Logistical Data:

3.26.2.1 At the completion of pilot hole drilling, Contractor shall provide a tabulation of coordinates, referenced to the drilled entry point, which accurately describe the location of the pilot hole. This tabulation shall be in addition to the log of recorded readings required under "Operational Data".

3.27 Unsuccessful Drill

3.27.1 Failed Pilot Hole or Pull back:

3.27.1.1 At PG&E's sole discretion, Contractor may be allowed to make three separate attempts to complete the pilot hole and install the pipeline. Additional locations for alternate pilot holes, entry points and exit points constitute a new design and must be approved by PG&E prior to start of drilling. At PG&E's sole discretion, after the third attempt the project will be classified as a failure.

3.27.2 Pipe Failure:

3.27.2.1 Contractor shall pull the entire length of welded transmission pipe back through the completed bore. In the event any portion of such welded pipe should fail during Contractor's pull of the pipe, such pipe failure shall be considered a bore failure.

3.27.2.2 Contractor shall install the pull section in the reamed hole in such a manner as to ensure that external pressures are minimized and an appropriate counter-balancing internal pressure is maintained. In the event the pipe is damaged as a result of external pressure during installation, Contractor shall repair such damage at no additional cost to PG&E.

3.27.3 Hole Abandonment

3.27.3.1 Abandonment of Pilot Hole:

3.27.3.1.1 If drilling is suspended during pilot hole drilling, Contractor shall execute the following general procedures:

3.27.3.1.2 Advancement of the drill string shall be halted.

3.27.3.1.3 Cement or Bentonite mixing and pumping equipment shall be mobilized to the drilling location and rigged up to the drill string.

3.27.3.1.4 Drill string shall be withdrawn and hole pumped with cement or industry-approved fill material to displace the Bentonite slurry material.

3.27.3.2 Abandonment During Reaming:

3.27.3.2.1 If drilling is suspended during the reaming of the hole, Contractor shall execute the following general procedures:

3.27.3.2.2 Pull back of the reaming string shall be halted.

3.27.3.2.3 Cement or Bentonite mixing and pumping equipment shall be mobilized to the drilling location and rigged up to the drill string

3.27.3.2.4 If possible, the reamer would be replaced with a cementing head.

3.27.3.2.5 Drill string shall be withdrawn and the hole pumped with cement or industry-approved fill material to displace the Bentonite slurry material.

3.27.3.3 If Reamer Could Not be Pushed Back to Exit End, then:

3.27.3.3.1 Drill string shall be withdrawn and the hole pumped with cement or industry approved fill material to displace the Bentonite slurry material.

3.27.3.3.2 Drilling rig shall be rigged down at entry end and rigged up at exit end.

3.27.3.3.3 Run in pilot-hole with cement head on pilot- hole drill string until previously cemented reamed hole is pumped.

3.27.3.3.4 Drill string shall be withdrawn and hole pumped with cement or industry approved fill material to displace the Bentonite slurry material.

3.28 General HDD Fluid Release Contingency Plan

3.28.1 Those HDD projects involving sensitive biological resources such as waterways, bodies of water, and wetland areas, require the development of a site specific frac-out contingency plan to deal with inadvertent releases of drilling fluids into terrestrial or aquatic environments. This plan shall be individually tailored to each project's size and related environmental issues. The goal of the plan is to effectively control, manage, and report any surface release of drilling fluids associated with HDD operations. The plan effectively involves seven sections or processes:

3.28.2 Establishment of an on-site materials list to manage and control drilling fluid surface releases, relevant to the project size and environmental issues involved with each project. Types and amounts of materials needed and their relevancy to each particular project shall be discussed and determined in the planning portion of each project. The following is a general list that should cover most HDD project situations:

Industrial grade PVC mesh with Steel "T"-posts, pipe material (such as a 55-gallon open ended drums, heavy PVC/CMP pipe, or culvert material).
Heavy weight plastic clean gravel filled sand bags (recommended 100)
Silt fencing (300-feet recommended)
Straw bales
Straw log or wattles (100 feet recommended)
Geotek filter bags, 10-by-12-foot size or equivalent
Several 5-gallon plastic buckets
Shovels (flat blade and round nose)
Wide heavy-duty push broom
Absorbent pads and plastic sheeting for placement beneath motorized equipment operating in the vicinity of a riparian/stream zone
Vacuum hose (100-feet minimum)
Portable pumps
Vacuum trucks (800 and 3000-gallon capacities)
The Site Specific Plan shall contain an inventory of equipment and materials, detailing quantities to be maintained on hand at the drilling site in the event of a Frac-out.

3.29 Pre-construction protection measures.

3.29.1 The following protection measures are recommended prior to beginning HDD operations:

Lining of entry or "return" pit with an impervious, flexible membrane.
Addition of dye to drilling fluid to aid in visible detection.
Creating an earth berm around drilling fluid mixing and pumping areas to contain any inadvertently spilled fluid. These areas may also be reinforced with straw bales or silt fencing.
Erecting sedimentation devices between the drilling staging areas and waterway. This also includes any nearby culvert or drainage ditch that leads to the waterway.

3.29.2 Biological monitoring program.

3.29.3 During drilling operations, visual inspection along the bore path of the alignment shall take place at all times and a written log shall be kept of daily construction activities. Contractor shall regularly provide the monitor with the following information throughout the entire HDD procedure:

Position of the drill head in relation to the point of entry
Estimate of the volume of drilling fluid pumped during the drilling process, as compared to the volume of current returns.
Abnormal drilling fluid pressures at time of occurrence.
Changes of drilling fluid contents.
Equipment breakdowns and repairs.

3.29.4 Some loss of returns may be inevitable as drilling fluids are absorbed by the lateral and subterranean fractures within the formation. A complete and sudden loss of returns serves as a signal to both the operator and the monitor that something more significant may be occurring and to watch closely for a possible surface release.

3.29.5 In the event of a frac-out, the onsite monitor has the authority to halt all operations until appropriate procedures are implemented.

3.29.6 Containment and control methods frac-outs.

3.29.6.1 Upon detection of a terrestrial or aquatic frac-out, the following plan of action shall be placed in effect:

Directional boring will stop immediately and the drill head will be pulled back to relieve pressure on the frac-out.

For terrestrial frac-outs in the project area, an earth berm will be constructed around it for containment. On-site materials consisting of industrial grade PVC mesh with steel T-posts and natural straw bales may also be installed around the frac-out areas to contain the fluid.

3.29.6.2 For frac-outs occurring beneath a waterway, any individual or combination of the following approaches may be used to contain the drilling fluid:

A sand bag berm surrounding the frac-out area (effective at water's edge situations).

A standing pipe (such as 55-gallon open ended drums, heavy PVC/CMP pipe, or culvert type material) tall enough to exceed the water level should be placed over the frac-out and sealed at the base by sand bags.

Industrial grade PVC mesh with steel T-posts and natural straw bales installed above and below the crossing site where the depth of the waterway allows.

Appropriate agency notifications shall be made per the Project Specific Communications Plan.

After these procedures are implemented, any drilling fluid that has been contained will be returned to the entry pit for re-use or removed using a vacuum truck and then transported to a disposal site as approved by the California Division of Oil & Gas.

3.29.7 Notification processes and contacts (Agency Notification).

3.29.8 Immediately notify on site Contractor supervisor and PG&E entities detailed on the Communications Plan.

3.29.9 Make all notifications to county and state agencies as appropriate and as required by the regulations of the local emergency services. A copy of the Communications Plan must be in possession of the Contractor's on-site supervisor.

3.29.10 As applicable, the following agencies may be notified in the event this contingency plan is implemented: California Department of Fish and Game (CDF&G), Regional Water Quality Control Board (RWQCB), California State Lands Commission (CSLC), U.S. Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USF&WS), and other entities as appropriate (local fire department, Highway Patrol, Rail Road, etc.).

3.30 Evaluation Plan

3.30.1 After containment and notification steps have been taken, PG&E management, drilling engineer, district engineer, or other third party facility owners' representative will evaluate the feasibility of continuing the boring process. At that time it will be decided whether to continue with the bore or implement the abandonment contingency plan (ACP) after evaluating the following:

3.30.1.1 The exact location of the drilling head assembly will be verified with portable locating equipment. If it is determined that the drilling profile does not match the planned profile, and exceeds design limits, the ACP will be implemented.

3.30.1.2 If the location and profile are within design limits, the specific weight of the drilling mud will be verified to ensure a slightly overbalanced condition to the surrounding formation. The specific weight will be adjusted as necessary.
3.30.1.3 If location, profile, and drilling mud weight are determined to be within design limits, and frac-out of Bentonite slurry is controlled, Contractor may be permitted to proceed.
3.30.1.4 Should it be determined that the stability of the bored crossing is in serious question, even if location, profile, and drilling mud weight are deemed satisfactory, the ACP will be implemented.
3.31 Haz-Mat Spill Contingency Plan
3.31.1 This will include preparations for a quick and safe cleanup of accidental spills.
3.31.2 It will prescribe the procedures for reducing the potential for a spill during construction and will include an emergency response program.
3.31.3 The plan will identify areas for refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted.

- GHG (Scope 1 and Scope 2) emissions
- Energy
- Water; and
- Waste

Goals should be specific, measurable, time-bound, and relevant to core business operations

3. Public Disclosure

Suppliers should report their performance against their environmental performance goals on an annual basis. Reporting should be readily available to the public and customers and should be quantifiable and measurable. Most suppliers choose to make performance reporting available on their website.

Definitions

Electric Utility Industry Sustainable Supply Chain Alliance (EUISSCA): Commonly known as 'the Alliance', EUISSCA was formed to promote environmental stewardship and provide value to customers and shareholders. Focusing on non-fuel (generation) suppliers, the Alliance's goal is to work with industry suppliers and other interested parties to improve environmental performance and advance sustainable business practices.

EUISSCA Sustainability Survey: This is a survey that is sponsored by EUISSCA. The Alliance members want to better understand how companies in their supply chain are considering climate change and working to reduce their impacts in key environmental performance areas. The survey is typically issued in the beginning of July and answers should be based on readily available data. This survey is the primary input for the environmental performance section of PG&E's supplier scorecard.

Environmental Management System (EMS): An EMS is an overall management system that includes a policy statement, organizational structure, planning, activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, monitoring, and maintaining an environmental policy.

An effective EMS should include the following elements

1) Environmental policy and planning
2) Implementation and operation;
3) Checking and corrective action; and
4) Management review.

Environmental performance: Refers to an organization's environmental impacts, the actions they are taking to address impacts and the results of those actions or lack thereof (e.g., GHG emissions, pollution prevention, utilization of natural resources, and others).

International reporting standards: There are several international reporting standards for collecting and reporting GHG emissions, energy use, and other environmental impacts. These standards help standardize the methodology, calculations, and reporting of this data.

They include but are not limited to:

- **Greenhouse Gas (GHG) Protocol:** The GHG Protocol is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage GHG emissions. www.ghgprotocol.org

- **Global Reporting Initiative (GRI):** The GRI provides all companies and organizations with a comprehensive sustainability reporting framework that is widely used around the world. www.Globalreporting.org

ISO-14001 certification: The International Organization for Standards (ISO) is a certification body that provides requirements and standards for an Environmental Management System (EMS)

.

Scope 1 and 2 GHG Emissions: The GHG Protocol defines three scopes of emissions:

- **Scope 1** - Direct GHG emissions are emissions from sources that are owned or controlled by the company. For example, emissions from combustion in owned or controlled boilers, furnaces and vehicles.

- **Scope 2** - Accounts for GHG emissions from the generation of purchased electricity by the company.

- **Scope 3** - Optional reporting category that allows for the treatment of all other indirect emissions. They are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples include third party deliveries, business travel activities and the use of sold products and services.

Top Tier PG&E Supplier: Any PG&E supplier classified as an Enterprise Strategic, Portfolio Preferred, or Valued supplier that will be reviewed through a formal PG&E scorecard review.

Attachment 11A
MSA No. 4400010156

Contract Work Authorization Form

This Contract Work Authorization ("CWA") is executed as of [insert date] ("Effective Date") between the company set forth below ("Contractor") and Pacific Gas and Electric Company ("PG&E") for performance of the Work in connection with the Capital Improvement Project ("Project") per the terms and conditions of the executed Master Service Agreement ("MSA"). The CWA (inclusive of Exhibits) and the MSA (inclusive of Attachments) form the entire contract between the Parties.

Contractor's Legal Name:	[Name]	**PG&E CWA No. [enter #]**
Contractor's Address:	[Street Address] [PO Box] [City, State Zip Code]	**This CWA consists of [enter #] pages.**
Project Name: **Job Location:**	[enter Name]	**PG&E MSA No. [insert]** **Executed: [insert date]**

By executing this CWA, the signatories below represent that he or she has the authority to bind the Party on whose behalf his or her execution is made.

Contractor	**PG&E**
Signature: _____ Name: _____ Title: _____ License No._____	Signature: _____ Name: _____ Title: _____

THE PARTIES AGREE TO THE FOLLOWING TERMS AND CONDITIONS.

1. Work or Services. Contractor will perform Work or Services in accordance with the Scope of Work set forth in Exhibit 1, the Agreed Program set forth in Exhibit 3, and the Contract Documents as defined in Article 1 of the MSA.

1.1 Project Team. The Project Team Members as defined in Article 1 of the General Conditions (Attachment 1, MSA) are identified in Exhibit 2.

1.2 Execution. The Contractor will execute the Work or Services in accordance with Exhibit 5. Prior to commencement of any Work or Services, the Contractor will have carefully examined all PG&E Provided Information set forth in Exhibit 7, the Agreed Program set forth in Exhibit 3, and the Contract Documents; investigated the nature, locality, and site of the Capital Improvement Project and the conditions and difficulties under which the Work or Service is to be performed; and enters into this CWA on the basis of its own examination, investigation, and evaluation of all such matters and not in reliance upon any opinions or representations of PG&E. Contractor will immediately report any error, inconsistency, or omission it may discover to PG&E. If Contractor observes that any of the PG&E Provided Information, the Agreed Program or any of the Contract Documents are at variance with any Applicable Law in any respect, or are internally inconsistent, it will promptly notify PG&E in writing. If

Contractor performs any Work or Service without having adequately reviewed the above referenced documents, knowing it to be contrary to any Applicable Law, or knowing them to be internally inconsistent, and without providing written notice to PG&E, it will assume full responsibility and bear all costs attributable to the violation.

2. Compensation. Contractor will be compensated per Article 6 of the General Conditions set forth in Attachment 1 of the MSA as follows. (check applicable box and insert amount, if applicable):

☐ Not-To Exceed Amount of $_____ per Section 6.2 of the General Conditions and Exhibit 4 to this CWA.
☐ Lump-Sum of $_____ per Section 6.3.1 of the General Conditions and Exhibit 4 to this CWA.
☐ Time and Materials per Section 6.3.2 of the General Conditions and Exhibit 4 to this CWA.
☐ Unit Cost per Section 6.3.3 of the General Conditions and Exhibit 4 to this CWA.
☐ Guaranteed Maximum Price of $_____ per Section 6.3.4 of the General Conditions and Exhibit 4 to this CWA.
☐ Target Cost of $_____ per Section 6.3.5 of the General Conditions and Exhibit 4 to this CWA.

3. Contract Time. The Contract Time is defined in Article 1 of the General Conditions to the MSA. The Contract Time for this Project is [insert date]. The Schedule is attached to this CWA as Exhibit 5A.

☐ Liquidated Damages in the amount of $_____ per day are applicable to this Project per Section 7.9 of the General Conditions to the MSA.

4. Insurance and Performance Security.

4.1 Insurance. Unless the insurance limits are specifically modified in Exhibit 7A to the CWA, the Contractor must provide and maintain insurance in accordance with Attachment 5 of the MSA.

4.2 Performance Security. Contractor will provide the credit instruments indicated below per Article 12 of the General Conditions to the MSA. (check applicable box or boxes)

☐ Parent Guaranty

☐ Letter of Credit

☐ Payment and Performance Bond

☐ Warranty Bond

5. Exhibits. The Exhibits included in the Table of Exhibits and attached hereto are incorporated into this CWA by reference.

6. **Conflicts**. All conflicts between the MSA (inclusive of all Attachments) and the CWA (inclusive of all Exhibits) will be resolved in accordance with Section 3.2 of the General Conditions to the MSA.

7. **Other Requirements**. Contractor will provide the following if required under this CWA.

☐ LEAN Program required per Section 15.1 of the General Conditions (Attachment 1, MSA).

☐ LEAN Workshop required per Section 15.2 of the General Conditions (Attachment 1, MSA).

☐ BIM Protocol required per Section 16.1 of the General Conditions (Attachment 1, MSA).

Attachment 11A
MSA No. 4400010156

Contract Work Authorization Form

Table of Exhibits

Exhibit Number	Document Title	Elect/Gas/Both	Included/N.I.C./By Amendment
Exhibit 1	**Scope of Work**	Both	Included
Exhibit 2	**Project Team Organization**		
Exhibit 2A	Key Personnel	Both	
Exhibit 2B	Responsibility Matrix	Both	
Exhibit 3	**Agreed Program**		
Exhibit 3A	Design and Performance Criteria	Both	
Exhibit 3B	Conceptual Design	Both	
Exhibit 3C	Construction Documents	Both	
Exhibit 3D	Milestone Schedule	Both	
Exhibit 3E	PG&E's Budget	Both	
Exhibit 4	**Compensation**		
Exhibit 4A	Contract Price Breakdown	Both	
Exhibit 4B	Material Pricing Worksheet	Both	
Exhibit 4C	Subcontractor Pricing Worksheet	Both	
Exhibit 4D	Clarifications Worksheet	Both	
Exhibit 4E	Job Estimate Worksheet	Both	
Exhibit 4F	Resource Loaded Work Plan	Both	
Exhibit 4G	Schedule of Values	Both	
Exhibit 5	**Schedule and Execution**		
Exhibit 5A	Schedule	Both	
Exhibit 5B	Subcontractors and Diverse Subcontractor Report	Both	
Exhibit 5C	Site Logistics Plan	Both	
Exhibit 5F	Traffic Control Plan	Both	
Exhibit 5G	Project Specific Site Safety Plan	Both	
Exhibit 5H	Quality Assurance / Quality Control Plan	Both	
Exhibit 6	**PG&E Provided Information**		
Exhibit 6A	Permits	Both	
Exhibit 6B	Clearance Detail	Both	
Exhibit 6C	Civil / Excavation Requirements	Both	
Exhibit 6D	Hydrostatic Strength Test Procedure	Gas	
Exhibit 6E	Operating Map	Both	
Exhibit 6F	Operating Diagrams	Both	
Exhibit 6G	Test Procedure	Both	
Exhibit 6H	Weld Procedure and Welding Pressure Table	Gas	
Exhibit 6I	Structure Locations	Both	
Exhibit 6J	Potholing Report and Data Sheet	Both	
Exhibit 6K	CNG Staging Area Requirements	Gas	
Exhibit 6L	Release to Construction Authorization	Both	

	(including environmental release)		
Exhibit 7	**Insurance and Performance Security**		
Exhibit 7A	Modified Project Specific Insurance Limits (if applicable)	Both	
Exhibit 7B	Parent Guaranty	Both	
Exhibit 7C	Letter of Credit or Payment and Performance Bond	Both	
Exhibit 7D	Warranty Bond	Both	
Exhibit 8	**PG&E Policies and Forms**		

ADMINISTRATION			
PG&E Negotiator	[enter Name]	**Contractor Representative**	
Phone	[enter #]	**Phone**	
Email	[enter Address]	**Email**	
Accounting Reference	[enter account number]		
PG&E Work Supervisor:	[enter Name]	**Phone:** [enter #]	
INVOICE INSTRUCTIONS: Contractor shall send invoices for each payment when due, showing the Contract number, to: PACIFIC GAS AND ELECTRIC COMPANY	**Send ORIGINAL Invoice to:** **(See note below if using PG&E's electronic invoicing system)**	PG&E Accounts Payable* PO Box 7760 San Francisco, CA 94120-7760	
	Send COPY of Invoice to:	[enter Name] [enter Street Address/Mail Code] [enter City, State Zip Code]	
	For information regarding invoice status, call PG&E's Paid Help Line at (800) 756-PAID (7243) or go to AP Web Reporting site at www.pge.com/actpay. *Note: Contractors using PG&E's electronic invoicing system do not need to mail a copy of the invoice to PG&E Accounts Payable.		

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